

ABC of oral health

Periodontal disease

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Most periodontal disease arises from, or is aggravated by, accumulation of plaque, and periodontitis is associated particularly with anaerobes such as *Porphyromonas gingivalis*, *Bacteroides forsythus*, and *Actinobacillus actinomycetemcomitans*. Calculus (tartar) may form from calcification of plaque above or below the gum line, and the plaque that collects on calculus exacerbates the inflammation. The inflammatory reaction is associated with progressive loss of periodontal ligament and alveolar bone and, eventually, with mobility and loss of teeth.

Periodontal diseases are ecogenetic in the sense that, in subjects rendered susceptible by genetic or environmental factors (such as polymorphisms in the gene for interleukin 1, cigarette smoking, immune depression, and diabetes), the infection leads to more rapidly progressive disease. Osteoporosis also seems to have some effect on periodontal bone loss.

The possible effects of periodontal disease on systemic health, via pro-inflammatory cytokines, have been the focus of much attention. Studies to test the strength of associations with atherosclerosis, hypertension, coronary heart disease, cerebrovascular disease, and low birth weight, and any effects on diabetic control, are ongoing.

Gingivitis

Chronic gingivitis to some degree affects over 90% of the population. If treated, the prognosis is good, but otherwise it may progress to periodontitis and tooth mobility and loss. Marginal gingivitis is painless but may manifest with bleeding from the gingival crevice, particularly when brushing the teeth. The gingival margins are slightly red and swollen, eventually with mild gingival hyperplasia.

Management—Unless plaque is assiduously removed and kept under control by tooth brushing and flossing and, where necessary, by removal of calculus by scaling and polishing by dental staff, the condition will recur. Although gingivitis has a bacterial component, systemic antimicrobials have only transient benefit and therefore no place in treatment. Surgical reduction of hyperplastic tissue by a periodontist (gingivectomy and gingivoplasty) may occasionally be required.

Periodontitis

Chronic periodontitis

Chronic periodontitis (inflammation of the gingiva and periodontal membrane) may be a sequel of chronic gingivitis, usually because of accumulation of plaque and calculus. The gingiva detaches from the tooth, the periodontal membrane and alveolar bone are damaged, and an abnormal gap (pocket) develops between the tooth and gum. The tooth may slowly loosen and eventually be lost.

Diagnosis—Chronic periodontitis (pyorrhoea) is typically seen in adults. It is painless but may be associated with bleeding, halitosis, and a foul taste. Debris and pus may be expressed from the pockets, and there may be increasing tooth mobility. Periodontitis cannot be diagnosed by inspection alone, however, and requires specific diagnostic tests (periodontal probing and, sometimes, radiographs).



Chronic marginal gingivitis showing erythematous oedematous appearance



Gingivitis with hyperplasia

- Good oral hygiene is essential both in preventing and treating periodontal disease
- Antimicrobial drugs have no place in treating chronic gingivitis



Periodontitis with damage to supporting tissues including bone

Management—Improvement in oral hygiene is necessary, but tooth brushing and mouthwashes have effect only above and slightly below the gum level. They are therefore ineffective in treating periodontitis, as plaque continues to accumulate below the gum line within periodontal pockets. Scaling and polishing and sometimes curettage are also required. Surgical removal of the pocket wall and diseased tissue may be needed to facilitate future cleansing, or attempts to regenerate lost periodontal tissue (such as guided tissue regeneration) may be indicated. Professional attention is therefore required. Although periodontal disease has a bacterial component, systemic antimicrobial drugs have no place in routine treatment, but topical treatment with antimicrobials within the periodontal pockets may be useful.

Periodontitis in young patients or which is rapidly advancing

If periodontitis is seen in children or young adults or is rapidly advancing, systemic factors should be excluded.

Gingival bleeding

Bleeding from the gingival margins is common and usually a consequence of gingivitis. It may be more obvious in women taking oral contraceptives and during the second and third trimesters of pregnancy. However, it may be a sign of platelet or vascular disorders and is common in leukaemia and HIV infection.

Gingival ulcers

Gingival ulcers are often of infectious aetiology.

Herpes simplex virus stomatitis is common in childhood but is increasingly seen in adults. There is a diffuse, purple, "boggy" gingivitis, especially anteriorly, with multiple vesicles scattered across the oral mucosa and gingiva. This is followed by ulcers. Diagnosis is usually clinical. The infection resolves spontaneously in 7–14 days, during which antipyretic analgesics such as paracetamol and adequate hydration are helpful. Antiviral drugs should be used in severe stomatitis and with immunocompromised patients, who may otherwise suffer severe infection. For those who can safely use it, an aqueous chlorhexidine mouthwash helps to maintain oral hygiene.

Acute necrotising ulcerative gingivitis—Also known as Vincent's disease and trenchmouth, this affects mainly adults and causes painful ulceration of the gums between the teeth (interdental papillae), a pronounced tendency to gingival bleeding, and halitosis. Anaerobic fusiform bacteria and spirochaetes are implicated, and predisposing factors include poor oral hygiene, smoking, malnutrition, and immune defects including HIV and other viral infections and leukaemias. Management includes oral debridement and instruction on oral hygiene, peroxide or perborate mouthwashes, and metronidazole 200 mg three times daily for three days.

Other causes—Gingival ulcers may also be due to aphthae, self injury in psychologically disturbed or mentally challenged patients, malignant neoplasms, drugs, dermatoses, or systemic disease (haematological, mucocutaneous, gastrointestinal, or chronic infections such as tuberculosis, syphilis, mycoses, herpesviruses, and HIV).

- Good oral hygiene is essential in treating periodontitis
- Periodontitis requires professional care, usually scaling and polishing and possibly periodontal surgery
- Periodontitis that is unresponsive to such care, advances rapidly, or appears at an early age may have a systemic background

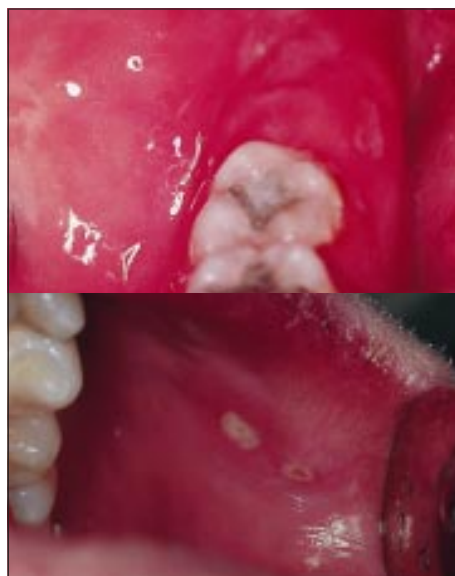
Causes of gingival bleeding

Local

- Gingivitis
- Chronic
- Acute necrotising
- Periodontitis
- Rarely, telangiectasia or angioma

Systemic

- Thrombocytopenia
- Leukaemia
- HIV infection
- Clotting defects
- Drugs such as anticoagulants



Herpetic stomatitis, with ulcerations on gingivae (top) and elsewhere in the mouth (bottom)



Necrotising (ulcerative) gingivitis

- Gingival ulceration in herpetic stomatitis is common and is associated with mouth ulcers elsewhere and fever
- Gingival ulcers with bleeding and halitosis suggest a diagnosis of necrotising gingivitis

Gingival swelling

Widespread gingival swelling can be a feature of chronic gingivitis and may be caused by drugs, pregnancy, and systemic diseases.

Drug induced gingival swelling—Drugs implicated include phenytoin, cyclosporin, and calcium channel blockers. Gingival swelling is usually worse if there is accumulation of plaque and calculus and the patient is receiving high drug doses. Improved oral hygiene and excision of enlarged tissue may be indicated.

Pregnancy gingivitis—This usually develops around the second month and reaches a peak in the eighth month. An exaggerated inflammatory reaction to plaque in pregnancy predisposes to gingivitis. Oral hygiene should be improved, particularly in view of the current concern that gingivitis may affect fetal birth weight. Pregnancy gingivitis tends to resolve on parturition.

Hereditary gingival fibromatosis—This rare autosomal dominant condition may be associated with hirsutism, but most patients are otherwise perfectly healthy, although there are rare associations with systemic syndromes. Surgical reduction of the gingiva may be indicated.

- **Gingival swelling may occur in pregnancy and typically resolves at parturition**
- **Gingival swelling may be drug induced—by phenytoin, cyclosporin, or calcium channel blockers**

Gingival lumps

Erupting teeth, particularly mandibular third molars, may be associated with swelling and tenderness of the overlying soft tissue flap (operculum), especially if this is traumatised by a tooth in the opposing dental arch. This condition, termed pericoronitis, is best treated by cleaning the area and having a dentist grind or remove the opposing tooth if it is causing trauma. If the patient is in severe pain or is feverish antimicrobials such as metronidazole 200 mg thrice daily for up to five days may be indicated.

Pregnancy epulis—Pregnancy may cause a localised swelling (epulis) of the gingival papillae, which may bleed or ulcerate. Occasionally, a large epulis requires surgical removal.

Fibroepithelial polyp—Also called a fibrous lump and fibrous epulis, this is benign in nature. It may need to be removed.

Malignant causes of gingival lumps include carcinoma, Kaposi's sarcoma, and lymphoma.

Red gingival lesions

The most common cause of redness is gingivitis, in which the erythema is usually restricted to the gingival margins and interdental papillae (see above). Red lesions may also be due to desquamative gingivitis, erythroplasia, haemangiomas, orofacial granulomatosis, Crohn's disease, sarcoidosis, Wegener's granulomatosis, and neoplasms such as carcinoma and Kaposi's sarcoma.

Desquamative gingivitis

Widespread erythema, particularly if associated with soreness, is usually caused by desquamative gingivitis. This is fairly common, is seen almost exclusively in women over middle age, and is usually a manifestation of lichen planus or mucous membrane pemphigoid. Its main features include persistent gingival soreness that is worse on eating and red gingivae. Diagnosis is usually obvious from the history and clinical

Causes of gingival swelling

Local causes

- Chronic gingivitis causing Gingival abscesses
- Fibrous epulis
- Hyperplastic gingivitis due to mouth breathing causing Exostoses
- Cysts
- Pyogenic granuloma
- Neoplasms

Systemic causes

- Hereditary gingival fibromatosis and related disorders
- Drugs (phenytoin, cyclosporin, calcium channel blockers)
- Pregnancy
- Sarcoidosis
- Crohn's disease
- Leukaemia
- Wegener's granulomatosis
- Rarely, amyloidosis, scurvy, midline lethal granuloma, mucopolysaccharidoses, mucopolipidoses



Cyclosporin induced gingival swelling



Pregnancy gingivitis



Pregnancy epulis (pyogenic granuloma)



Desquamative gingivitis; usually a sign of pemphigoid (as here) or lichen planus

features, but biopsy and immunostaining may be needed to establish the precise cause.

Management is based on treating the underlying condition and, if there are extraoral lesions, systemic treatment, usually with corticosteroids. Desquamative gingivitis can also often be improved with better oral hygiene and topical corticosteroids such as fluocinonide cream used by a dentist in a plastic splint over the teeth and gums.

Gingival pigmentation

This is usually a normal condition mainly seen in certain races (such as black people). Other causes include particles of dental amalgam embedded in the soft tissues, Addison's disease, Kaposi's sarcoma, drugs such as minocycline, melanotic macules and naevi, and melanoma.

Halitosis

Oral malodour (foetor oris) predominantly originates from the tongue coating, gingival crevice, and periodontal pockets. Plaque organisms—especially *Porphyromonas gingivalis*, fusobacteria, and other anaerobes—cause putrefaction, resulting in release of volatile chemicals, particularly sulphide compounds (including hydrogen sulphide, methylmercaptan, dimethyl sulphide, and dimethyl disulphide).

Some oral malodour is common in healthy individuals, particularly after sleep (morning breath). People who refrain from oral hygiene soon develop malodour, but this is worse with any form of sepsis of the aerodigestive tract such as gingivitis, periodontitis, dental abscess, dry socket, sinusitis, tonsillitis, nasal foreign bodies, and tumours.

Many foods and drinks can cause malodour, especially garlic, onions, curries, the fruit durian, etc. Smoking and drugs—including alcohol, isosorbide dinitrate, and disulphiram—may also be implicated. Rare causes include diabetic ketoacidosis, renal or hepatic dysfunction, and psychiatric disease, as in delusional halitosis or as a feature in schizophrenia.

Management

Management requires establishing the presence of true halitosis and assessing its severity with a portable sulphide monitor (halitometer). Dietary, infective, and systemic causes must be excluded. A full assessment of oral health is always indicated.

The most reliably effective management is

- Improving oral hygiene
- Eating regularly
- Avoiding odiferous foods, drugs, and other substances
- Chewing sugar-free gum regularly
- Using one of the many oral deodorants available over the counter
- Using an antibacterial mouthwash or one such as Retardex or Dentyll
- In severe or recalcitrant cases, using metronidazole 200 mg thrice daily for seven days.

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- Desquamative gingivitis is not uncommon in women over middle age
- Most desquamative gingivitis is caused by lichen planus or pemphigoid



Gingival pigmentation is common in black people

Mouthwashes with antimicrobial activity

Chlorhexidine gluconate

- 0.1-0.2% aqueous mouthwash, rinse for 1 minute twice daily
- Has measurable antiplaque activity
- May stain teeth superficially if patient drinks tea, coffee, or red wine

Povidone iodine

- 1% mouthwash used 2-4 times daily for up to 14 days
- Contraindicated in iodine sensitivity, pregnancy, thyroid disorders, or those taking lithium

Cetypyridinium chloride

- 0.05% mouthwash used twice daily

Hexetidine

- 0.1% mouthwash used twice daily

Further reading

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